# Outbreak response of Measles-Rubella in Displaced Populations : A case study of Liberian Refugees in Cote d'Ivoire and Review of the Literature

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# 論文内容要旨


**Background:** Measles is a highly contagious infectious disease with a significant public heath impact especially among displaced populations due to unique situations such as mass population displacement, high population density in camps and low measles vaccination coverage among children. Particularly, high case fatality rate in populations displaced by disasters has been documented while the case fatality rate in stable population is generally less than 1%. In recent years, refugees and internally displaced persons have been increasing. Since 1989, approximately 70,000 refugees have fled from Liberia to Cote d'Ivoire to escape the civil war. They were transferred from the western border areas to transit camps in Abidjan. Refugee's vaccination status was poor. These Transit camps were often cramped and overcrowded. From January to April 2004, concurrent measles and rubella outbreaks were investigated in four of the 19 transit camps hosting 2,767 Liberian refugees in Cote d' Ivoire.

**Objectives:** -To describe the epidemiology and response to measles and rubella outbreaks in Cote d'Ivoire transit camps for Liberian refugees in 2003–2004.

-To define the epidemiology and risk factors of measles transmission, morbidity and mortality in displaced population through a review of literatures.

-To define risk factors of measles transmission, morbidity and mortality to be considered by public health officials and humanitarian workers throughout the surveillance and outbreak investigation.

**Methods:** The epidemiological data of concurrent measles and rubella outbreaks in Cote

d'Ivoire transit camps for Liberian refugees was described retrospectively. In addition, a systematic review of literatures on the PubMed and the Morbidity and Mortality Weekly Report of the Centers for Disease Control and Prevention databases was conducted using combinations of several keywords. The articles that described measles outbreaks with quantitative data were selected for analysis.

**Results:** In 2004, concurrent measles and rubella outbreaks occurred in four camps hosting 2,767 Liberian refugees in Cote d' Ivoire. Sixty rash and fever cases were identified. From 19 January to 23 February 2004 (weeks 8 to 13), measles IgM testing had resulted in 61.1% positive. The highest incidence rate (18.5%) of measles was observed in children below 9 months. Ninety-three percent of children aged between 6 months and 15 years received a measles vaccine during week 13, but the rash and fever cases continued to occur. This prompted a systematic test for both measles and rubella IgM antibodies. Rubella IgM testing had resulted in 74.0% positive from 14 February to 25 April (weeks 11 to 21). The highest incidence rate (3.88%) of rubella was found in children between 5–15 years. Supplemental immunization with a measles-mumps-rubella (MMR) vaccine was conducted during week 20. This study highlights the importance of testing for both measles and rubella in refugee settings.

In addition to the case study in Cote d'Ivoire transit camps, the review of literature had found a total of 9 articles describing measles outbreak in disaster and displaced populations with quantitative data. These 9 articles included description of 11 outbreaks. Analysis showed that, seven out of 8 outbreaks had occurred in a condition of poor vaccination status (vaccination coverage; 17-57%) as described also in the case study in Cote d'Ivoire transit camps while 1 outbreak had occurred in a context of high vaccine coverage from prior one-dose vaccination strategy failure. The age of cases was ranged from 1 month to 39 years. Children aged 6 months -5 years were the most common target group for vaccination, while 1622 cases (51% of the total cases) were older than this target age groups. Higher case fatality rates (> 5%) were reported in 5 outbreaks. On the other hand, no fatalities were reported in two outbreaks in which active surveillance together with passive surveillance were carried out.

**Conclusion:** Outbreaks of measles and rubella were detected by the diseases surveillance team in 2003–2004 among Liberian refugees living in overcrowded Cote d'Ivoire transit camps. Active-case findings besides existing passive surveillance may have contributed in the rapid response towards the control of measles as well as rubella outbreaks in displaced populations. However, serological testing for both rubella and measles during the early stage of an outbreak could have controlled rubella outbreak earlier. Furthermore, vaccination programs with MMR rather than with measles vaccine alone should be a priority due to the potential misdiagnosis of measles and, for its advantage in the control of rubella and congenital rubella syndrome.

【所定様式⑬No.1】大学院の課程による者（課程博）

# 審　査　結　果　の　要　旨

博士論文題名 Outbreak response of Measles-Rubella in Displaced Populations: A case study of Liberian Refugees in Cote d'Ivoire and Review of the Literature.

所属専攻・分野名 医学系　専攻・微生物分野

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上記の論文はコートジボアールの難民キャンプにおける麻疹と風疹の同時流行について文献的考察を含めてまとめたものである。疫学的な解析や考察についても十分な水準に達しており、主論文がイギリスの Peer Review Journal である Epidemiology and Infection にアクセプトされていることからも、博士論文に値する論文であると認められる・

よって，本論文は博士（医学）の学位論文として合格と認める。